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ABSTRACT

Data from the Youth79 cohort of the National Longitudinal Surveys were used to examine the acquisition of skills by young adults at the start of a job and as a response to changes in the workplace. The analysis was based primarily on a set of questions posed in 1993 to a group of workers between the ages of 28 and 36. It was discovered that approximately 37% of young workers were unable to perform their duties adequately at the start of their current job. Individuals who participated in learning activities at the start of their job typically spent 104 hours on such activities. Of every five young workers, approximately two needed to learn new job skills in response to changes (for example, the introduction of new equipment and/or repair procedures) in the workplace that had occurred during the year preceding their interview. Workers participating in training to acquire new skills in response to changes at the workplace generally spent 16 hours on those activities. In general, young workers with higher levels of educational attainment and higher aptitudes were most likely to spend time in learning activities in response to changes at the workplace. (MN)

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Work and Family: Learning to do the Job

Data from the National Longitudinal Surveys

U.S. Department of Labor
Bureau of Labor Statistics

Report 903
March 1996

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This issue of *Work and Family* examines the acquisition of skills by young adults at the start of a job and as a response to changes at the workplace. The analysis is based primarily on a set of questions asked of 28- to 36-year-old workers in 1993. Some of the more significant findings include:

- About 37 percent of young workers were unable to perform their duties adequately at the start of their current job;
- Participants in learning activities at the start of their job typically spent 104 hours, or about 2 1/2 weeks of full-time work, in these activities.
- About 2 of 5 young workers had to learn new job skills due to changes at work in the year preceding the interview. The introduction of new equipment and/or repair procedures was the most common job change that required the upgrade of workers' skills.
- During the course of acquiring new skills due to changes at the workplace, workers usually spent 16 hours, or about 2 full working days, in these activities.
- Those with greater educational attainment and higher aptitudes were more likely than others to spend time in learning activities due to changes at the workplace.

Investments in job training are commonly thought to increase workers' productivity and wages. Yet research into the effects of training, particularly training provided by employers, has been limited by a lack of comprehensive and representative data on training investments. While there is a growing set of data which contains information concerning formal employer-provided training, much less is known about more informal ways in which workers learn new tasks.[1]

[1] Recent analyses which examine the provision of formal training are: Harley J. Frazis, Diane E. Herz, and Michael W. Horrigan, "Employer-Provided Training: Results from a New Survey," *Monthly Labor Review*, May 1994; Jonathan R. Veum, "Training Among Young Adults: Who, What Kind, and For How Long?," *Monthly Labor Review*, August 1993.

This report presents information on the acquisition of skills among workers using data from the Youth79 cohort of the National Longitudinal Surveys (NLS). These data describe a sample of young men and women who were between the ages of 14 and 22 in 1979 and who were interviewed annually from 1979 to 1994. After 1994, respondents are to be interviewed every other year.

This survey contains some of the most comprehensive data currently available on human capital investments, particularly investments in job training, among young adults. Between 1979 and 1986, the survey collected information about the occurrence and duration of all government-sponsored training programs and all privately supported training that lasted at least 4 weeks. In subsequent years, the training questions in the survey were changed so that respondents were asked about all types of formal training (up to four programs) since the last interview, regardless of duration. Although these measures of training are more comprehensive than those available from the 1979-86 surveys, they do not capture the extent of informal training.

In 1993, respondents for the first time were asked about more informal forms of on-the-job learning, such as receiving instruction from supervisors or observing coworkers. In the 1993 survey, working respondents were asked about two forms of learning: the acquisition of skills when they began their job and learning new tasks related to changes at work within the prior 12 months. This report presents tabulations generated from the responses to these two sets of questions.[2]

Learning at the start of a job

Working respondents, in 1993; were asked about skill acquisition when they began their specific tasks and duties with their current employer. Only those who reported that they were not able to perform all their duties adequately when they started these tasks were asked about new skills received.

Those questioned were asked if they learned to perform their duties by taking classes or seminars, learning from

[2] For a more detailed analysis of the responses to these questions, see Mark A. Loewenstein and James R. Spletzer, "Informal Training: A Review of Existing Data and Some New Evidence," NLS Discussion Paper 94-20, November 1994.

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supervisors, spending time with coworkers, using self-study materials, or by any other form of learning. Individuals could respond to each form of learning if they learned skills from multiple sources. They were also asked about the amount of time spent learning their new tasks.[3]

Participation. A majority of workers (63.2 percent) were able to perform their duties adequately when they began their job. While there are only small differences by sex and race/ethnicity, there are strong patterns by education and aptitude. Greater education and higher aptitudes appear to be inversely related to the ability to perform duties adequately at the start of the job. That is, those with higher education and greater aptitude were least likely to perform their duties adequately when they began the job.

These patterns may reflect differing forms of employment by those of different education and aptitude levels. The highly educated and those with high aptitudes are probably employed in high-skill jobs involving complex tasks that require the acquisition of a variety of skills when they are first hired. Conversely, those at the lower ends of the education and aptitude distributions are more apt to be employed in jobs that involve more basic tasks which do not necessitate additional learning.

Table 1 provides tabulations on the percent of workers who were able to perform their duties adequately when they began their job. The data in table 1 are stratified by sex, race and ethnicity, educational attainment, and score on the Armed Forces Qualifying Test (AFQT), which was taken as a measure of aptitude. The AFQT score derives from selected sections of the Armed Services Vocational Aptitude Test (ASVAB), and is used as a primary criterion of enlistment eligibility. Because all respondents took this test in 1980 when they were of different ages, individuals are categorized by the quartile rank of their AFQT score for their particular age.

Among those unable to perform all their duties adequately when they started their job, virtually all (97.7 percent) reported undergoing some form of skill learning when they began their job. Over 65 percent learned from a supervisor, and about 65 percent learned from coworkers. Nearly 50 percent underwent self-study to learn about their new duties, while over 25 percent attended classes or seminars. (See table 2.)

There are few differences between men and women in the likelihood of participating in any form of learning when beginning a job, but there are some differences by race/ethnicity, particularly between blacks and Hispanics. Blacks were more likely than Hispanics to attend classes/seminars and to learn from supervisors or coworkers. Hispanics, however, were more likely to undertake self-study than blacks .

Education and aptitude both appear to be directly correlated with participation in classes/seminars, self-study, and

[3] Respondents were asked about time spent in all forms of learning except for learning in the "other" category.

Table 1. Percent of working individuals aged 28-36 able to perform their duties adequately when they started their job, 1993

Characteristic	Able to perform duties adequately	Unable to perform duties adequately
Total	63.2	36.8
Sex:		
Men	62.3	37.7
Women	64.3	35.7
Race or ethnicity:		
White	62.1	37.9
Black	68.8	31.2
Hispanic	65.7	34.3
Education:		
Less than high school	76.9	23.1
High school graduate	64.0	36.0
Some college	62.8	37.2
College graduate	56.8	43.2
Armed Forces Qualifying Test quartile:		
Lowest	73.5	26.5
Third	71.8	28.2
Second	61.5	38.5
Highest	55.0	44.0

SOURCE: National Longitudinal Survey of Youth79

"other" forms of learning. In contrast, learning from supervisors or coworkers appears to be unrelated to education and aptitude. These differences probably occur for two reasons. First, they may indicate that those with more education and aptitude hold jobs with greater complexity where classes/seminars and self-study are more prevalent forms of learning than less complex jobs. Second, they may reflect differences between individuals and their propensity to acquire additional education and training. For instance, individuals who invest more heavily in formal education may also be more willing to take classes and undertake self-study when beginning a new job.

Duration of learning. Table 3 provides the median hours spent in the various forms of learning among those who experienced the particular form of skill acquisition.[4] Young adults who participated in learning spent about 104 hours doing so. Those who learned from coworkers spent about 52 hours with them, which is more than any other source. Participants averaged about 48 hours in classes or seminars, 30 hours learning from supervisors, and 20.5 hours in self-study.

Although there are few differences by sex in participation in on-the-job learning at the start of the job, there are large differences between men and women in time spent learning. Among participants, men spent about 140 hours in skill acquisition and most women spent about 80 hours. The gap in hours is fairly large for each of the forms of learning. For instance, most men spent twice as much time learning

[4] Median hours are presented rather than mean hours because the distribution of training duration is highly skewed by a small number of very long spells. Consequently, the median provides a better representation of the experiences of most workers than the mean.

Table 2. Among those unable to perform duties adequately at the start of their job, percent of working individuals aged 28-36 who participated in on-the-job learning activities, 1993

Characteristic	Total	Classes/ seminars	Learned from supervisor	Learned from coworker	Self-study materials	Other
Total	97.7	26.2	65.4	65.6	48.0	24.3
Sex:						
Men	97.4	25.7	67.2	64.8	46.7	24.3
Women	98.1	26.7	63.3	66.5	49.6	24.4
Race or ethnicity:						
White	97.6	26.0	64.9	65.8	48.0	25.4
Black	98.3	29.9	71.2	66.8	46.1	15.6
Hispanic	97.0	21.4	62.2	60.7	51.3	25.0
Education:						
Less than high school	99.2	10.7	65.4	59.9	26.2	18.1
High school graduate	97.7	20.0	65.5	65.6	40.3	20.8
Some college	97.2	29.2	61.5	66.3	55.7	27.4
College graduate	97.6	36.2	68.3	66.3	58.1	28.6
Armed Forces Qualifying Test quartile:						
Lowest	97.8	14.2	70.0	61.7	27.3	13.5
Third	97.1	19.7	63.8	64.6	41.5	20.4
Second	97.5	25.3	63.6	66.3	50.2	23.0
Highest	97.9	32.3	66.0	66.5	54.2	29.5

NOTE: The percentages for the types of learning may add up to more than the totals because some individuals received training from more than one source.

SOURCE: National Longitudinal Survey of Youth79

Table 3. Median hours spent in learning activities among individuals aged 28-36 who participated in learning activities at the start of their job, 1993

Characteristic	Total	Classes/ seminars	Learned from supervisor	Learned from coworker	Self-study material
Total	104.0	48.0	30.0	52.0	20.5
Sex:					
Men	140.0	71.0	40.0	80.0	30.0
Women	80.0	40.0	24.0	40.0	20.0
Race or ethnicity:					
White	116.0	48.0	32.0	60.0	24.0
Black	80.0	40.0	16.0	40.0	20.0
Hispanic	75.5	40.0	20.0	40.0	19.0
Education:					
Less than high school	49.5	39.0	25.0	40.0	16.0
High school graduate	94.0	60.0	30.0	45.0	20.0
Some college	128.0	40.0	35.0	71.0	20.0
College graduate	120.0	46.5	30.0	57.0	30.0
Armed Forces Qualifying Test quartile:					
Lowest	43.0	32.0	20.0	40.0	10.0
Third	120.0	45.0	40.0	78.0	24.0
Second	106.0	60.0	29.0	60.0	24.5
Highest	120.0	48.0	30.0	60.0	24.0

NOTE: Median hours are for those who participated in the particular form of learning. Median hours for the total does not necessarily equal the sum of median hours for each form of learning.

SOURCE: National Longitudinal Survey of Youth79

from coworkers as did women. The smallest difference between men and women is for self-study. Men spent about 30 hours in self study compared to 20 hours for women.

Similarly, the race/ethnicity differences in hours of learning are much more pronounced than that of participation. Typically, whites spent 116 hours learning, blacks 80 hours, and Hispanics 76 hours. These race/ethnicity differences are particularly evident for learning from supervisors or coworkers. For example, whites spent twice as much time learning from supervisors as did blacks.

Hours of learning do not exhibit as clear a pattern by either education or score on the Armed Forces Qualifying Test. Still, there are some marked patterns by education and aptitude. High school dropouts clearly spent less time learning than individuals in all other education categories. Also, those in the lowest AFQT quartile spent substantially less time learning than those with higher AFQT scores.

Learning new skills

In addition to learning experiences at the start of the job, workers were also asked about forms of learning they may have participated in within the prior 12 months due to changes at work. Workers were asked about changes that may have occurred due to the introduction of new products or equipment, the employer's need to upgrade employees' skills, the creation of work teams, reorganization, and new government regulations. The full list of work changes and the percent of workers in each category is provided in table 4.

Those who underwent a change at work in the prior 12 months were asked about methods of learning new skills and the time spent in these learning activities. Similar to the classifications for learning at the start of a job, workers who gained new skills were asked if they learned them in classes or seminars or from a supervisor, coworker, or through self-study. In addition, workers were asked if they had acquired any skills on their own, apart from any instruction provided by the employer.

Table 4. Percent of working individuals age 28-36 who had to learn new job skills in the prior 12 months, 1993

Reason	Percent
Total	39.3
Employer introduced new equipment and/or repair procedures	20.3
Employer introduced a new service or product	16.4
Employer needed employees to acquire or upgrade their computer skills	15.7
Work site was reorganized in other ways	12.2
Work teams were created or changed	11.9
New government regulations went into effect	9.9
Changes occurred in employer's policies such as compensation, benefits, pensions, and safety	9.5
Changes occurred in the work rules for reasons other than new government regulations	6.9
Employer needed to upgrade employees' basic skills such as math, reading, or writing	1.7
Other	3.5

NOTE: The percentages for the different types of job changes add up to more than the total because some individuals reported more than one reason to learn new job skills.

SOURCE: National Longitudinal Survey of Youth79

Participation. Over nine-tenths of those who experienced job changes at work participated in learning activites to acquire new skills in 1993. (See table 5.) Over half learned from a supervisor, while less than half used self-study materials to learn new skills. About three-tenths took classes or seminars, learned from coworkers, or learned the new skills on their own.

The overall percentages for participation in learning activities for men and women are only slightly different and the differences across types of learning are fairly small. Similarly, the differences by race and ethnicity are also relatively small. Whites were less likely than blacks and Hispanics to learn new skills from a supervisor. In addition, Hispanics were less likely than others to learn from coworkers.

As with learning at the start of a job, education and AFQT scores appear to be positively correlated with participation in classes/seminars and self-study.[3] New skills acquired through learning on their own also appear to be directly related to education and aptitude. These patterns are most likely to occur because those with relatively more education and greater aptitudes hold more complex jobs than others and because individuals differ in their inclination to pursue continued education and training. In addition, college graduates and those in the two highest aptitude quartiles were less likely to learn from a supervisor, which may indicate that those who learn from supervisors hold lower level jobs than others.

Duration of learning. Most individuals who participated in these forms of learning activities, spent an average of 16 hours, or about 2 full work days, learning new skills, which is substantially less than time spent learning duties at the start of the job. (See table 6 for information on median hours.) Most workers who learned the new skills on their own spent 20 hours doing so, which is more than from any other source. Individuals who took classes or seminars or underwent self-study typically spent 8 hours, or 1 full work day in this type of training. Learning from a coworker usually took 6 hours, while learning from a supervisor typically involved about 3 hours of time.

While men spent more hours in all forms of learning than women, the major difference between them is in time spent

[3] Cross-tabulations by AFQT score within each educational category are not presented here because the sample sizes within each cell for this breakdown do not allow for meaningful comparisons. However, data on formal training indicate that aptitude plays a role independent of schooling in the receipt of formal training. For instance, see *Work and Family: Employer-Provided Training Among Young Adults*, Report 838, February 1993.

Table 5. Percent of working individuals age 28-36 in 1993 who participated in learning activities and who were required to learn new skills due to a change at work within the prior 12 months, 1993

Characteristic	Total	Classes/ seminars	Learn from supervisor	Learn from coworkers	Self-study materials	Own learning	Other
Total	91.1	30.8	54.1	30.0	44.1	28.8	4.1
Sex:							
Men	90.0	29.4	54.7	29.0	43.4	30.0	3.5
Women	92.4	32.3	53.4	31.1	44.9	27.6	4.7
Race or ethnicity:							
White	90.6	30.6	51.3	30.3	44.2	28.9	4.0
Black	93.4	31.8	66.7	30.3	42.3	28.8	4.2
Hispanic	93.0	32.1	66.6	24.9	46.7	28.4	4.8
Education:							
Less than high school	87.2	14.9	55.0	30.4	25.3	21.5	3.0
High school graduate	90.7	27.2	59.8	29.6	39.0	23.1	4.2
Some college	90.3	31.9	55.7	26.8	45.4	27.7	4.2
College graduate	93.2	38.0	45.0	33.1	53.8	39.0	4.1
Armed Forces Qualifying Test quartile:							
Lowest	89.7	21.2	64.7	28.9	31.1	23.1	3.2
Third	91.0	27.8	65.3	26.8	40.4	22.6	2.7
Second	90.5	32.5	50.1	28.5	47.4	28.7	4.3
Highest	91.9	33.2	49.4	32.6	46.6	32.9	4.7

NOTE: The percentages for the types of learning may add up to more than the totals because some individuals received training from more than one source.

SOURCE: National Longitudinal Survey of Youth79

Table 6. Median hours spent in learning activities among individuals aged 28-36 in 1993 who participated in learning activities within the prior 12 months

Characteristic	Total	Classes/ seminars	Learn from supervisor	Learn from coworkers	Self-study materials	Own learning
Total	16.0	8.0	3.0	6.0	8.0	20.0
Sex:						
Men	20.5	8.0	4.0	8.0	9.5	31.0
Women	12.0	7.0	3.0	5.0	8.0	12.5
Race or ethnicity:						
White	18.0	8.0	4.0	7.0	9.0	20.0
Black	11.0	6.0	3.0	5.0	8.0	10.0
Hispanic	15.0	7.0	4.0	5.0	8.0	13.5
Education:						
Less than high school	12.0	6.0	2.0	8.0	10.0	30.0
High school graduate	12.0	5.5	3.0	6.0	8.0	15.0
Some college	17.5	6.5	3.5	5.0	8.5	20.0
College graduate	23.0	8.0	4.0	8.0	10.0	24.0
Armed Forces Qualifying Test quartile:						
Lowest	8.0	4.0	2.0	5.0	6.0	8.0
Third	11.0	8.0	2.0	4.0	8.0	10.0
Second	16.0	8.0	4.0	6.0	9.0	20.0
Highest	21.0	8.0	4.0	8.0	10.0	30.0

NOTE: Median hours are for those who participated in the particular form of learning. Median hours for the total does not necessarily equal the sum of median hours for each form of learning.

SOURCE: National Longitudinal Survey of Youth79

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learning on their own. Men typically spent 31 hours learning on their own, as opposed to 12 hours by women.

Whites spent more hours in learning new skills than Hispanics, and Hispanics more than blacks. Similar to the difference between men and women, the race/ethnicity differences appear to be driven by differences in time spent learning on their own. Whites spent one and a half as much time in learning on their own as Hispanics, and twice as much time as blacks.

Median hours of all forms of new-skills learning appear to increase with both education level and AFQT score. In particular, there are substantial differences between those in the lowest and highest education and AFQT categories. For instance, a typical college graduate spent 23 hours learning new skills, while a high school dropout usually spent only 12 hours in skill acquisition. Also, those in the highest AFQT quartile spent about 21 hours in learning activities, while those in the lowest usually spent about 8 hours.

One exception to the educational pattern occurs for time spent learning on their own. High school dropouts spent more time in learning on their own than those with more education. This finding might suggest that although relatively few high school dropouts undertook this form of learning, those who did were particularly inclined towards trying to upgrade their skills.

Technical Note

Data in this report are from the National Longitudinal Surveys which are sponsored by the Bureau of Labor Statistics (BLS). The NLS were begun in the mid-1960s with the drawing of four samples: Young Men who were 14-24 years old as of April 1, 1966, Young Women who were 14-24 years old as of January 1, 1968, Older Men who were 45-59 years old as of April 1, 1966, and Mature Women who were 30-44 years old as of April 1, 1967. Each sample originally had about 5,000 individuals with oversamples of blacks. In the early 1980s, the Young Men and Older Men surveys were discontinued. The two women's surveys continue and are currently collected every 2 years.

In 1979, a new cohort was begun with a sample of over 12,000 young men and women who were 14-21 years of age as of January 1, 1979. It includes oversamples of blacks, Hispanics, economically disadvantaged whites, and youth in the military. The military oversample was discontinued after the 1984 survey, and the economically disadvantaged white oversample was discontinued after the 1990 survey. This survey is called the Youth79 cohort, and the cohort members were interviewed annually from 1979 to 1994. After the 1994 interview, respondents are scheduled to be interviewed every other year.

In 1997, data collection will begin for a new cohort of youth. The sample will consist of approximately 12,000 young men and women aged 12-17 as of January 1, 1997. It will include oversamples of blacks and Hispanics. This survey will be called the Youth97 cohort, and the cohort members will be interviewed annually.

The data in this report are weighted so that the sample is representative of the age group studied. The sample includes those individuals in 1993 who, since the last time they were interviewed, worked at least 9 weeks at a job in which they usually spent 10 hours or more per week (the questions on learning at the start of a job are asked only of those meeting these weeks and hours restrictions). Estimates use the 1993 sampling weight. All inferences discussed in the text are statistically significant at the 90-percent confidence level. Due to sampling variability, small differences that are not discussed in the text should be interpreted with caution.

For a detailed explanation of the NLS, see *NLS Handbook 1995* (Center for Human Resource Research, The Ohio State University). For information about the NLS, or to be placed on a mailing list for this publication, or write to National Longitudinal Surveys, Bureau of Labor Statistics, Office of Employment and Unemployment Statistics, 2 Massachusetts Ave., NE., Room 4945, Washington, DC 20212-0001, call (202) 606-7405, or send e-mail to JAIN_RITA@BLS.GOV.

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